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(71) Applicant(s)
Kao Corporation

(Incorporated in Japan)

14-10 Nihonbashi, Kayaba-cho 1-chome, Chuo-ku, Tokyo, Japan

(72) Inventor(s)
Yasuo Toyoshima
Tetsuya Kusagawa
Miyuki Kondo
Mitsugu Hamajima
Minoru Nakanishi

(74) Agent and/or Address for Service
Withers & Rogers
4 Dyer's Buildings, Holborn, LONDON, EC1N 2JT, United Kingdom

(54) Absorbent Article Having Grooves

(57) An absorbent article such as a sanitary napkin comprising a liquid permeable skin-contacting surface, a liquid impermeable outer surface and an absorbent layer wherein the liquid permeable skin-contacting surface is provided with grooves (15,16) in both the longtitudinal and transverse directions such that the distance between the innermost side portions of the pair of front grooves (16) in the widthwise direction is less than the distance between the outermost portions of the pair of rear grooves (15) in the widthwise direction. The said grooves improve the leakage prevention properties the absorbent article.

Fig. 1

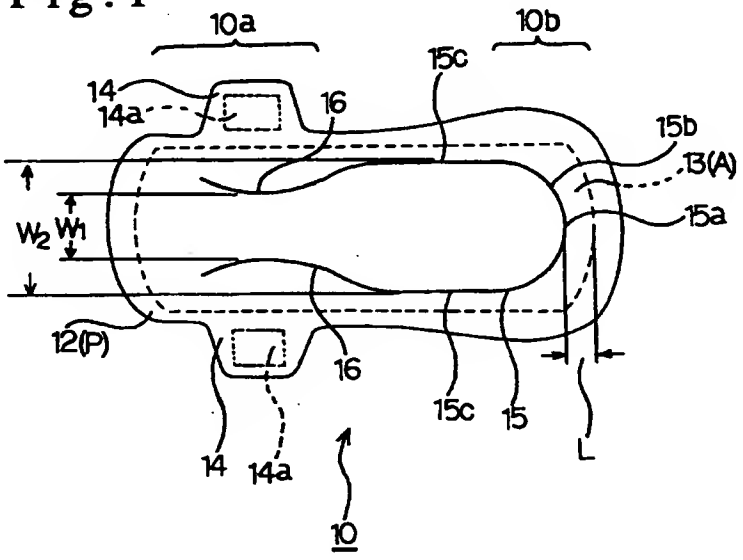

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Fig. 1

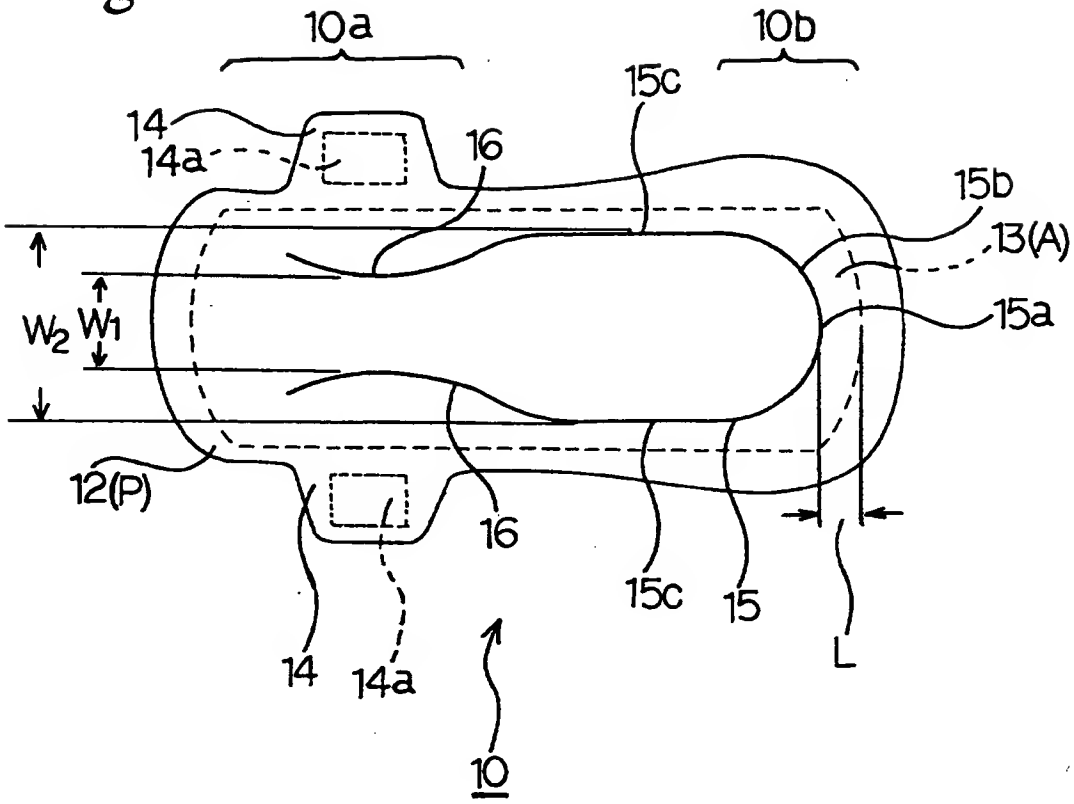

10a
10b
15c
14
14a
16
15b
13(A)
15a
W2
W1
12(P)
16
15c
15
L
14
14a
10

Fig. 2

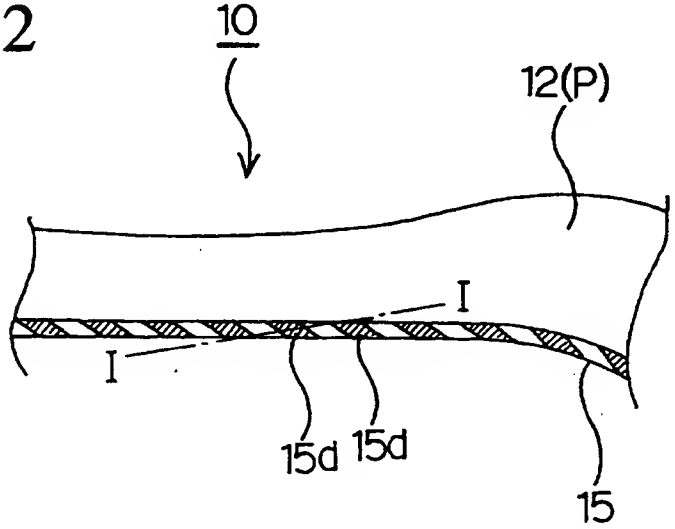

10
12(P)
I
I
15d
15d
15

Fig. 3

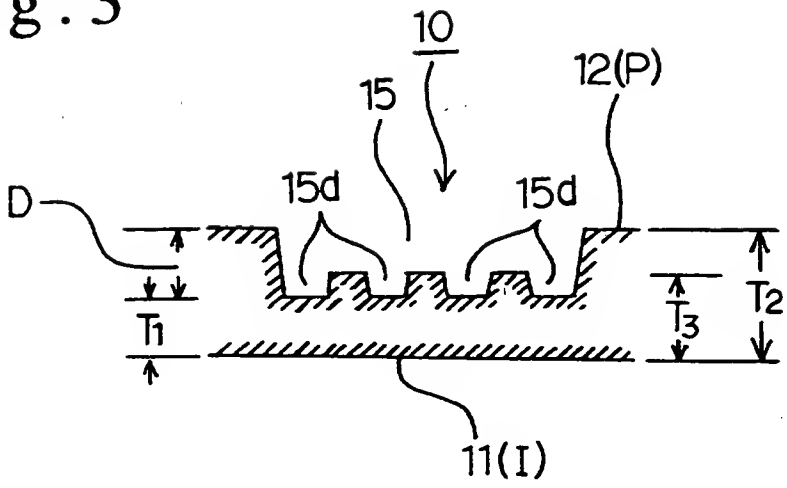

10
15
12(P)
15d
15d
D
T1
T3
T2
11(I)

Fig. 4

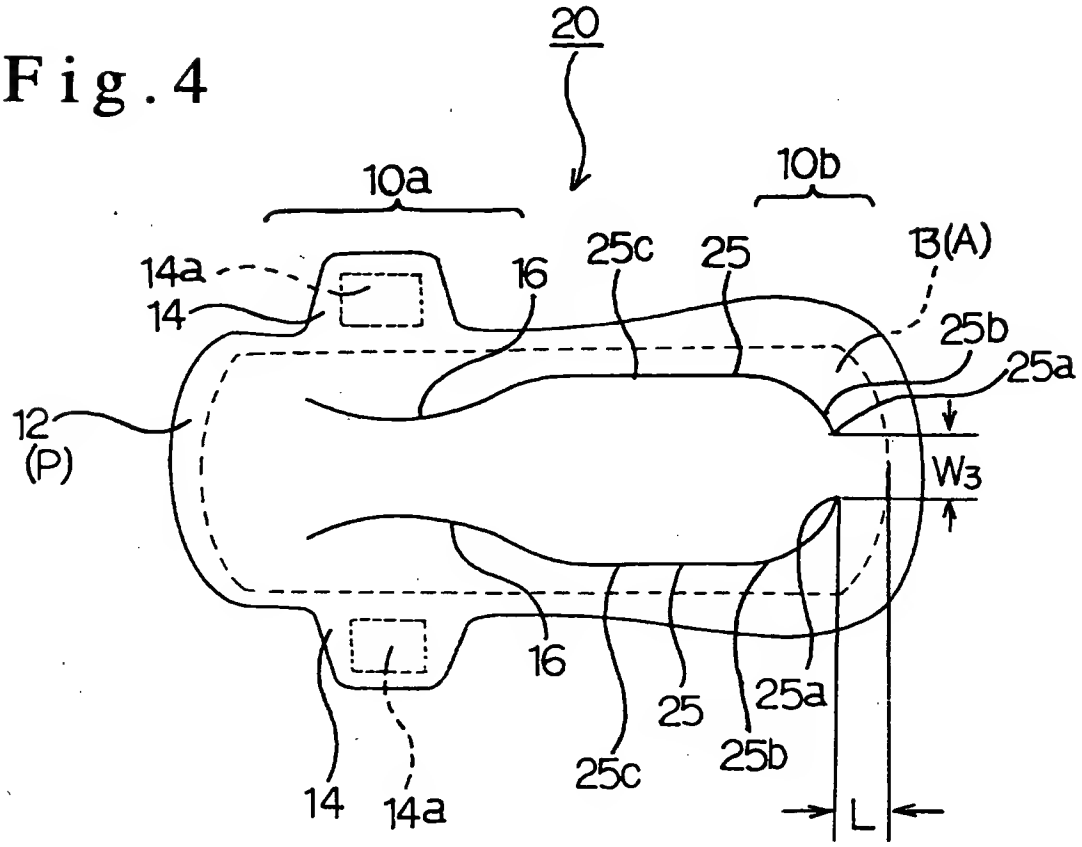

20
10a
10b
14a
14
16
25c
25
13(A)
25b
25a
12
(P)
W3
16
25
25a
25c
25b
14
14a
L

Fig. 5

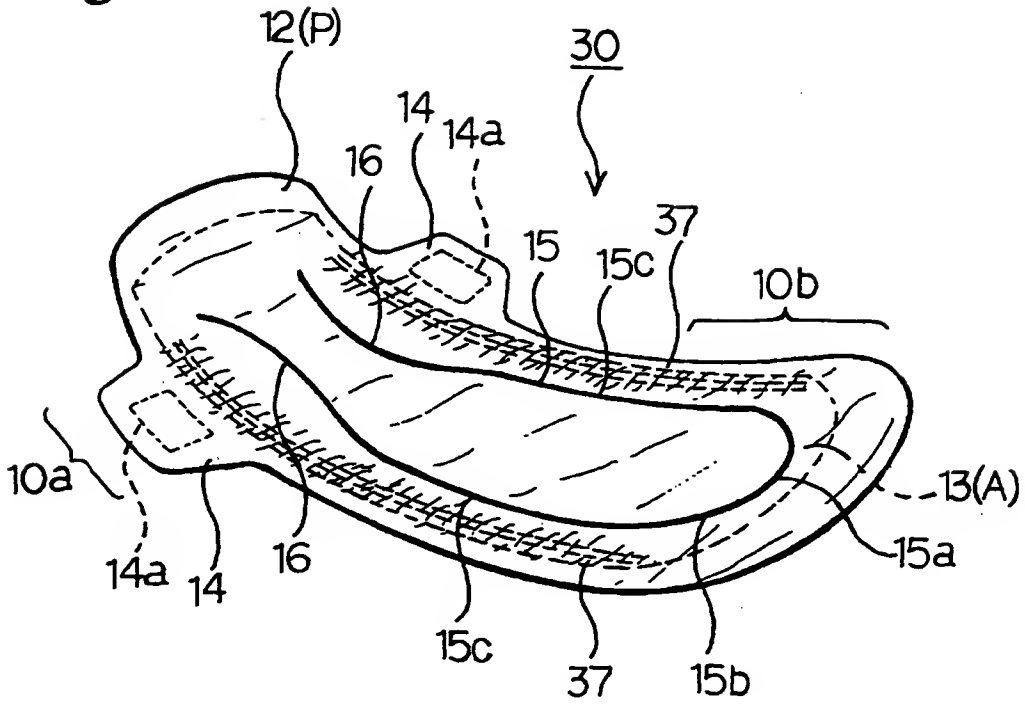

12(P)
30
14
14a
16
15
15c
37
10b
10a
13(A)
15a
14a
14
16
15c
37
15b

Fig. 6

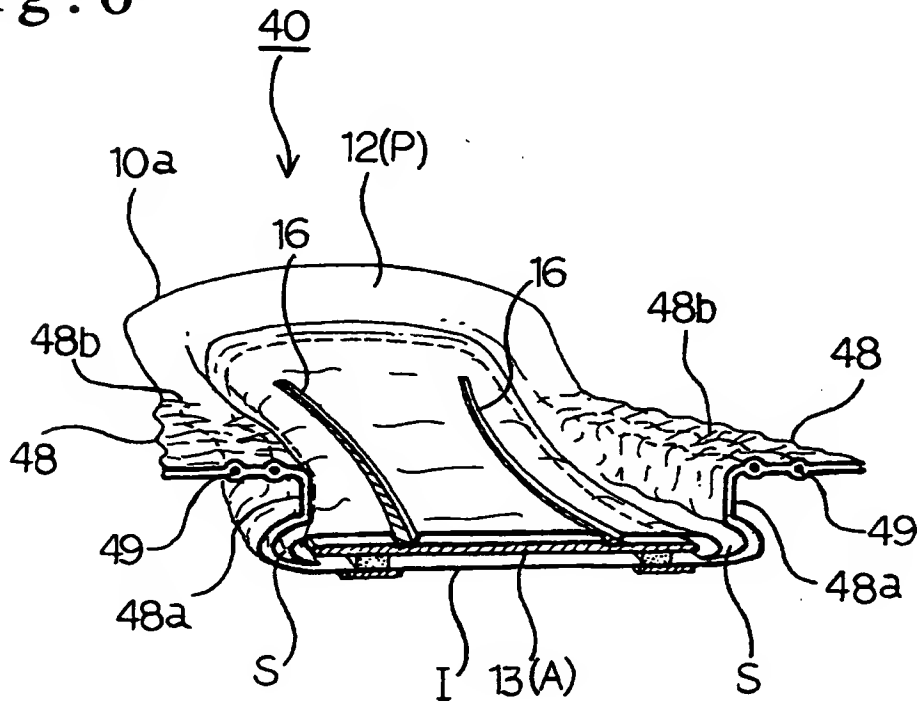

40
10a
12(P)
16
16
48b
48b
48
48
49
49
48a
48a
S
I
13(A)
S

Fig. 7

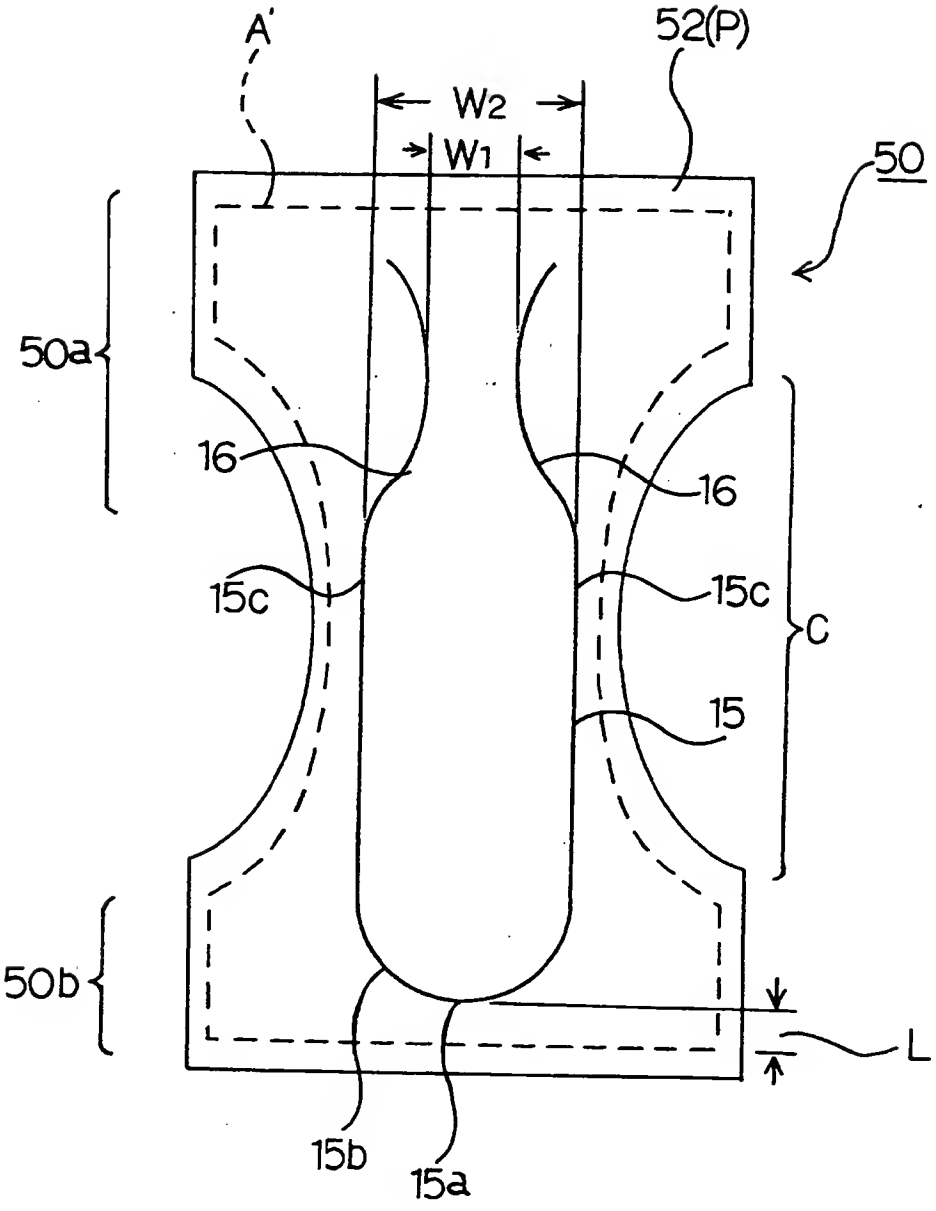


Fig. 8

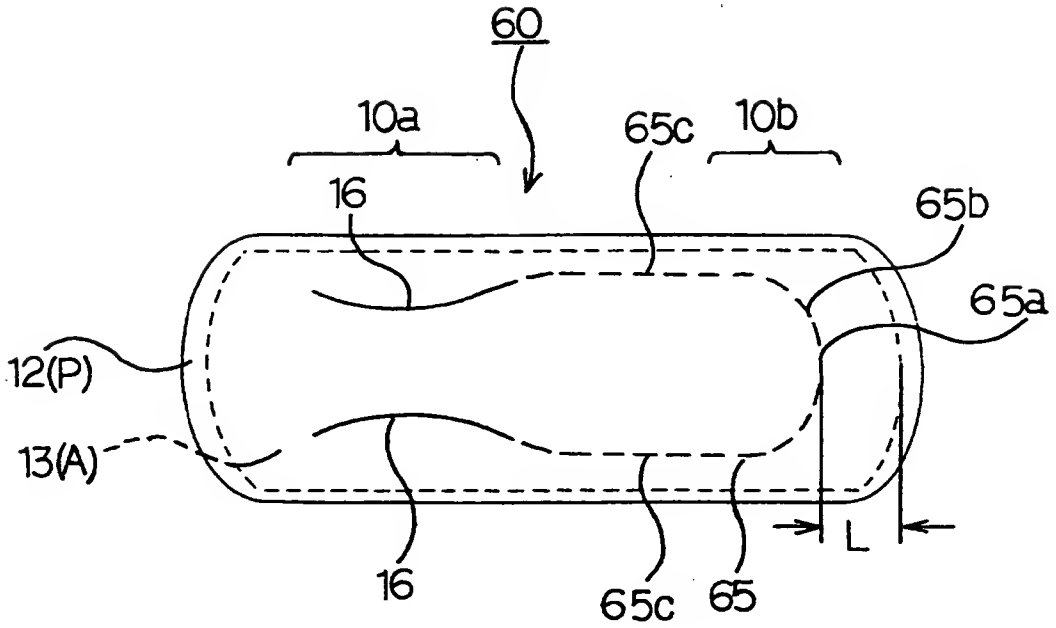

60
10a
65c
10b
16
65b
65a
12(P)
13(A)
16
65c
65
L

Fig. 9

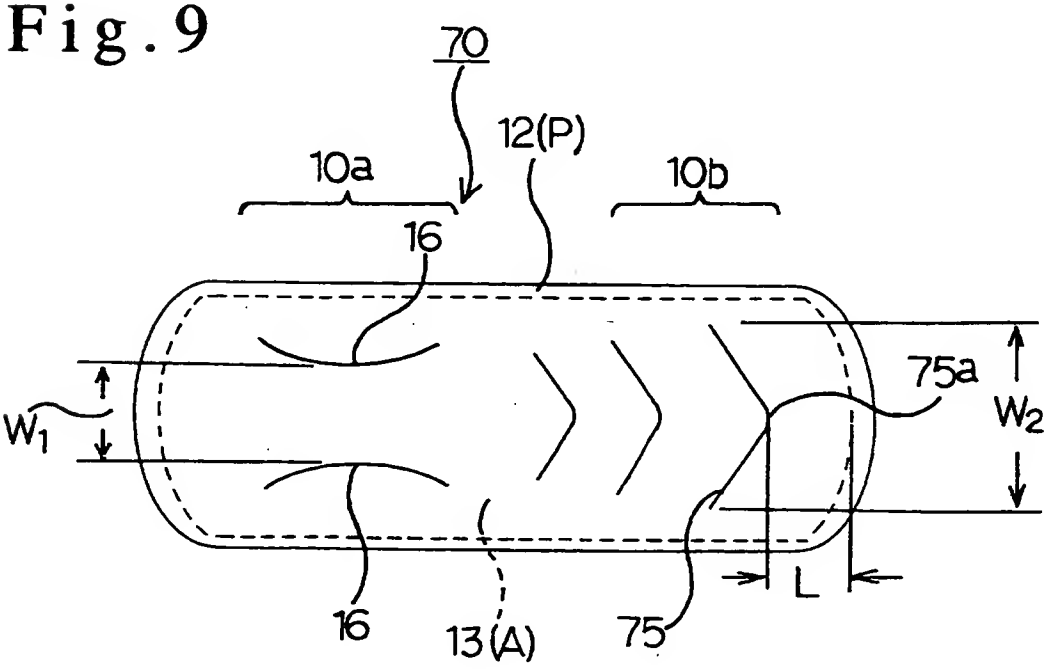

70
12(P)
10a
10b
16
75a
W1
W2
16
13(A)
75
L

Fig. 10

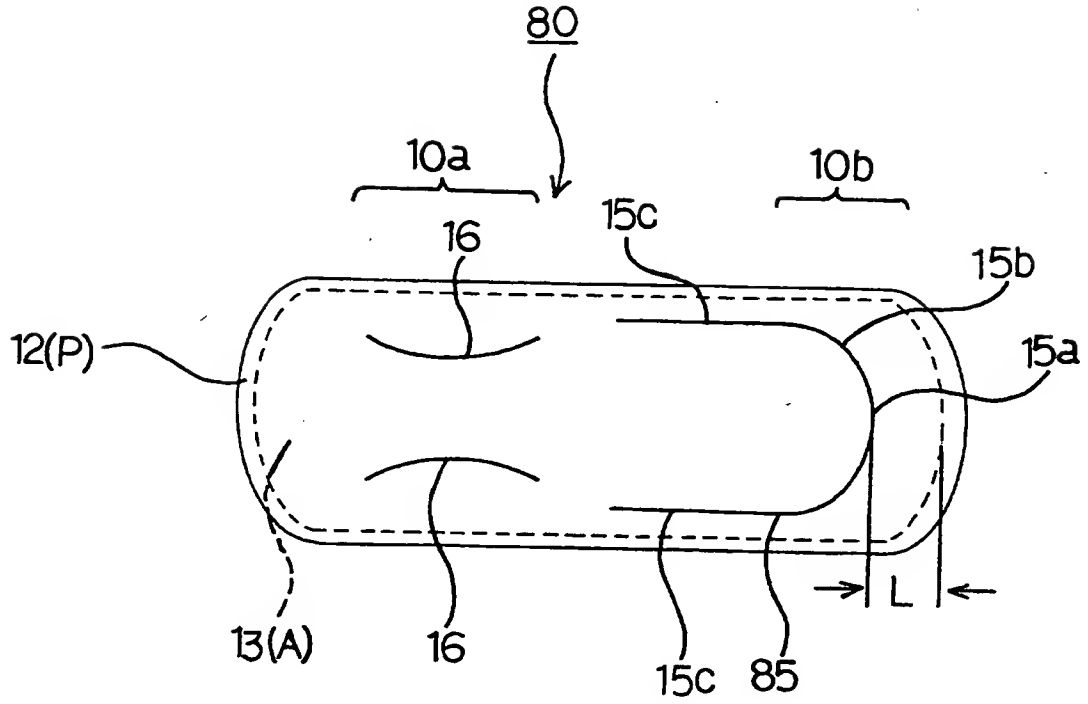
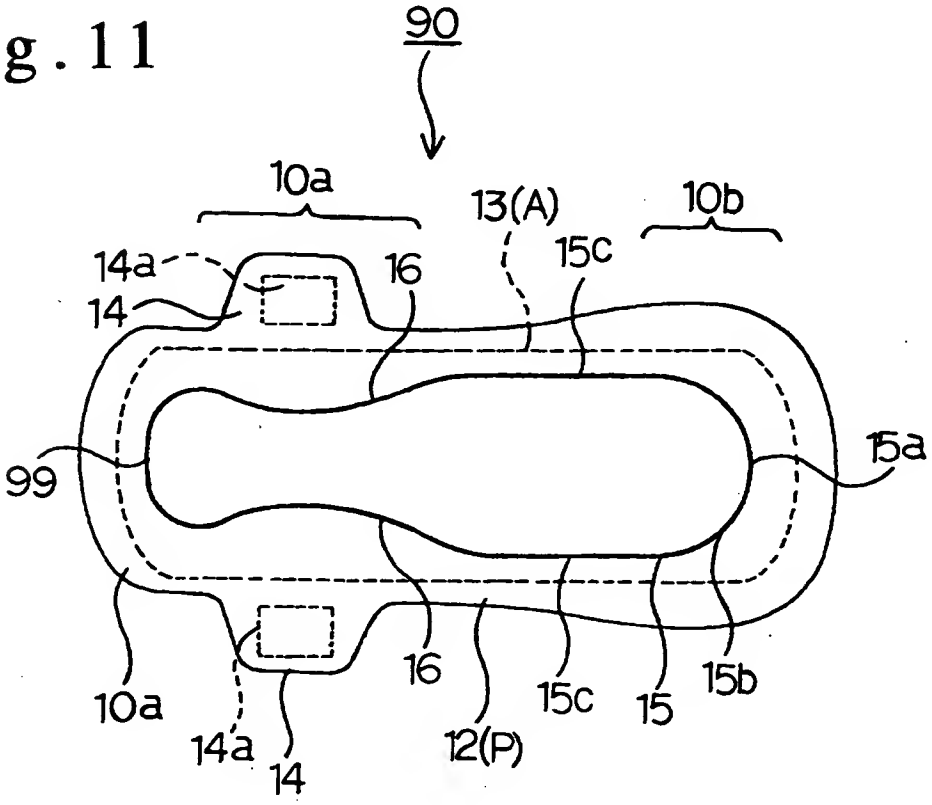

80
10a
10b
15c
16
15b
12(P)
15a
L
13(A)
16
15c
85

Fig. 11


90
10a
13(A)
10b
14a
16
15c
14
15a
99
16
15c
15
15b
10a
14a
14
12(P)

ABSORBENT ARTICLE

This invention relates to an absorbent article such as a sanitary napkin and an incontinent pad, and more particularly to an absorbent article having an excellent leakage preventive property.

Heretofore, there have been proposed various absorbent articles such as a sanitary napkin, an incontinent pad, a panty liner and a paper diaper, which each include a liquid-permeable skin contacting surface, a liquid-impermeable skin non-contacting surface, and an absorbent member interposed between the skin contacting surface and the skin non-contacting surface, and are formed substantially into a vertically elongate configuration. An absorbent article, which is used during sleeping, for quite a long time or for the purpose of absorbing a large amount of body fluid, tends to give such problems that body fluid leaks and flows along the wearer's body or along the surface of the absorbent article, or oozes out of its end portion through the absorbent member, due to the wearer's posture, such as lying on its side or on its back, or due to a large amount of body fluid. Also, in such an

absorbent article, leakage often occurs especially at its rear part or side part.

Therefore, many proposals have been made in order to avoid leakage of body fluid by forming a groove or grooves in an absorbent article, thereby intercepting body fluid or preventing body fluid from spreading, as disclosed in Japanese Utility Model Laid-Open Application No. 56-59013, Japanese Utility Model Laid-Open Application No. 1-111002, and Japanese Patent Laid-Open Application No. 64-49555. However, in those proposed conventional techniques, leakage, especially leakage from the rear part of an absorbent article, is not completely prevented.

SUMMARY OF THE INVENTION

It is, therefore, an object of the present invention to provide an absorbent article capable of reliably preventing leakage of body fluid from its side part and rear part.

As a result of extensive search and development with a view to obviating the above-mentioned problems, the inventors of the present invention have found out that an absorbent article including grooves of a prescribed configuration arranged at a prescribed location can achieve the above object.

The present invention has been accomplished based on the above finding. According to the invention, there is provided an absorbent article comprising a liquid-permeable skin-contacting surface, a liquid-impermeable skin non-contacting surface, and an absorbent member interposed between the skin contacting surface and the skin non-contacting surface, and formed into a substantially elongate configuration, wherein the absorbent article further comprises a pair of front grooves formed, in a longitudinal direction of the absorbent article, in the skin contacting surface of a contacting portion which is applied to a body fluid discharging portion of a wearer, in wear, and a rear groove formed, in the widthwise direction of the absorbent article, in the skin contacting surface of a rear portion which is applied to a rear side of the wearer, in wear, a distance between the rearmost portion of the rear groove and the rear end of the absorbent member is 10 mm to 50 mm, and a distance between innermost side portions of the pair of front grooves in a widthwise direction of the absorbent article is shorter than a distance between outermost side portions of the rear groove in the widthwise direction of the absorbent article.

In the present specification, in the present

specification, a "skin contacting surface" means a surface which contact the wearer's skin when the absorbent article is worn.

Also, a "skin non-contacting surface" means a surface which does not contact the wearer's skin when the absorbent article is worn.

The above-mentioned "a pair of front grooves formed in a longitudinal direction of the absorbent article" suffice if the grooves are formed along the opposing sides edges in the longitudinal direction of the front portion of the absorbent article. Preferable specific configurations of the front groove include various configurations as shown in the embodiments described later.

The above-mentioned "rear groove formed in a widthwise direction of the absorbent article" suffices if the rear groove is formed in the rear portion of the absorbent article in the widthwise direction thereof. Preferable specific configurations of the rear groove include various configurations as shown in the embodiments described later.

The absorbent article according to the present invention can satisfactorily prevent the side and rear leakage.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a plan view showing a sanitary napkin as the first embodiment of an absorbent article according to the present invention;

Fig. 2 is a plan view of a main portion of the sanitary napkin of Fig. 1;

Fig. 3 is a sectional view taken on line I-I of Fig. 2;

Fig. 4 is a plan view showing a sanitary napkin as the second embodiment of an absorbent article according to the present invention;

Fig. 5 is a perspective view showing a sanitary napkin as the third embodiment of an absorbent article according to the present invention;

Fig. 6 is a sectional perspective view showing a sanitary napkin as the fourth embodiment of an absorbent article according to the present invention;

Fig. 7 is a plan view showing an incontinent pad for men as the fifth embodiment of an absorbent article according to the present invention;

Fig. 8 is a plan view showing a sanitary napkin as a further embodiment of an absorbent article according to the present invention;

Fig. 9 is a plan view showing a sanitary napkin as a still further embodiment of an absorbent article

according to the present invention;

Fig. 10 is a plan view showing a sanitary napkin as a yet further embodiment of an absorbent article according to the present invention; and

Fig. 11 is a plan view showing a sanitary napkin as an additional embodiment of an absorbent article according to the present invention.

DESCRIPTION OF THE EMBODIMENT

The first embodiment of an absorbent article according to the present invention will be specifically described hereinafter with reference to the drawings.

Fig. 1 is a plan view showing a sanitary napkin as the first embodiment of an absorbent article according to the present invention, Fig. 2 is a plan view of a main portion of the sanitary napkin of Fig. 1, and Fig. 3 is a sectional view taken on line I-I of Fig. 2.

As shown in Fig. 1, an absorbent article (sanitary napkin) 10 according to this embodiment comprises a liquid-permeable skin contacting surface P, a liquid-impermeable skin non-contacting surface, and an absorbent member A interposed between the skin contacting surface P and the skin non-contacting surface. The absorbent article 10 is formed substantially in a vertically elongate configuration.

More specifically, the skin contacting surface P is formed of a liquid-permeable top sheet 12, and the skin non-contacting surface is formed of a liquid-impermeable back sheet. The top sheet 12 and the back sheet are adhered to each other at the opposing ends in the longitudinal direction of the sanitary napkin 10.

Opposing left and right side edge portions of the top sheet 12 and the back sheet extend outwardly in the widthwise direction thereby forming wings 14, 14. An adhesive agent is applied to the surfaces of the back sheets of the wings 14, 14, thereby forming fixing portions 14a, 14a. The fixing portions 14a, 14a are each protected by a peelable paper, a peelable film, or the like (not shown).

The above-mentioned construction is the same as that of the conventional absorbent article. As the material for forming the top sheet 12 and the back sheet, and as the adhesive agent for forming the fixing portions 14a, 14a, ordinarily known one may be used without any limitation.

The absorbent article 10 comprises, as shown in Fig. 1, a pair of front grooves 16, 16 formed, in a longitudinal direction of the sanitary napkin 10, in the skin contacting surface P of a portion 10a contacting the discharging portion (hereinafter referred to as

"contacting portion 10a") which, in wear, contacts the wearer's portion where body fluid is discharged, and a rear groove 15 formed, in a widthwise direction of the sanitary napkin 10, in the skin contacting surface P of a rear portion 10b which contacts a rear side of the wearer in wear. A distance L between a rearmost portion 15a of the rear groove 15 and a rear end of the absorbent member A is 10 mm to 50 mm, and a distance W_1 between the innermost side portions of the pair of front grooves 16, 16 in a widthwise direction of the sanitary napkin 10 is shorter than a distance W_2 between the outermost side portions of the rear groove 15 in the widthwise direction of the sanitary napkin 10.

The distance L is necessarily 10 mm to 50 mm, and preferably 10 mm to 30 mm. If the distance L is shorter than 10 mm, the possible amount of body fluid to be absorbed at the rear side of the groove becomes so small that there is a fear that the body fluid, which flowed backwardly from the rear groove 15 and leaked, is not absorbed by the absorbent member A and leaks from the absorbent article 1. In contrast, if the distance L is longer than 50 mm, the distance between the rear groove 15 and the discharging position may become so close that there is a fear that too much body fluid flows into the rear groove 15 with the

result that the body fluid easily passes across the rear groove 15 and flows backwardly.

More specifically, in the sanitary napkin 10 according to this embodiment, the rear groove 15 comprises a rear portion 15b formed in an arcuate configuration along a rear end of the absorbent member A and in a widthwise direction of the sanitary napkin 10, and a pair of side portions 15c, 15c extending linearly forwardly from the rear portion 15b along the longitudinal opposing side edges of the sanitary napkin 10.

The rear groove 15 and the front groove 16 are preferably 1 mm to 10 mm in depth D, and more preferably 3 mm to 8 mm. If the depths D of the rear groove 15 and the front grooves 16 are less than 1 mm, it is difficult to obtain the effect in intercepting the body fluid flowing on the surface. In contrast, if the depths D are more than 10 mm, the perception of disorder is given to the wearer.

The ratio T_1/T_2 of the thickness T_1 at a portion of the sanitary napkin 10 where the rear groove 15 is formed with respect to the thickness T_2 at a portion where no groove is formed is preferably 0.05 to 0.7, and more preferably 0.1 to 0.5.

If T_1/T_2 is less than 0.05, when the rear groove 15 and the front grooves 16, 16 are formed in a

sanitary napkin having a preferable thickness T_2 (the thickness T_2 of the sanitary napkin 10 is preferably 1.5 mm to 15 mm, and more preferably 2 mm to 10 mm) by pressing, the rear groove 15 and the front grooves 16, 16 become too rigid and the fitness is sometimes degraded. In contrast, if T_1/T_2 is more than 0.7, it is difficult to obtain the effect in sufficiently intercepting the flow of body fluid in the absorbent member A.

A preferable construction of the grooves is described hereinafter.

As shown in Figs. 2 and 3, the rear groove 15 is formed by applying a groove processing such that a plurality of diamond-shaped small grooves 15d are non-continuously concaved from the skin contacting surface P side along a prescribed configuration, and that the areas between adjacent two small grooves 15d, 15d are also concaved from the skin contacting surface P. Thus, the rear groove 15 has a two-stage depth of deeply concaved small groove parts and shallowly concaved areas between adjacent two small grooves. Owing to the continuous concavities in two depths of the small grooves 15d and the area between two adjacent small grooves 15d, 15d concaved below the skin contacting surface P, the rear groove 15 can have a deep

depth D while maintaining a high resilience of the groove portion, thereby providing a favorable fitness. The size of each small groove 15d is preferably 1 mm^2 to 100 mm^2. If the size is smaller than 1 mm^2, the effect for intercepting body fluid is not sufficient. In contrast, if the size of each small groove 15d is larger than 100 mm^2, a favorable resilience is difficult to obtain. An arrangement pitch of the small grooves 15d is preferably 0.5 mm to 5 mm. If the pitch is smaller than 0.5 mm, it is difficult to obtain a favorable resilience and a nice contact to the skin. In contrast, if the pitch is larger than 5 mm, non-concaved portions are formed between two adjacent small grooves 15d, 15d with the result that the leakage preventive effect is decreased.

In the groove processing for non-continuously forming the small grooves 15d, the ratio T_3/T_2 of the thickness T_3 of the sanitary napkin 10 at an area between two adjacent small grooves 15d with respect to the thickness T_2 at an area where no grooves are formed, is preferably 0.2 to 0.8, and more preferably 0.3 to 0.6, in view of the effect for intercepting body fluid and the comfortable wearing perception.

The ratio T_1/T_3 of the thickness T_1 of the sanitary napkin 10 at an area where the small grooves

15d are not formed with respect to the thickness T_3 at an area between two adjacent small grooves 15d, 15d is preferably 0.1 to 0.8, and more preferably 0.3 to 0.7, in view of the effect for intercepting body fluid and the comfortable wearing perception.

In a groove processing method, an embossing roll having a diamond-shaped embossed concavities and having a prescribed temperature is pressed and thermally compressed against a sanitary napkin having no grooves from the skin contacting surface side in the thickness direction of the sanitary napkin.

The pair of front grooves 16, 16 are each formed in a convexly arcuate configuration from the opposing longitudinal side edge portions inwardly of the sanitary napkin 10 in plan view in laterally symmetrical relation to each other. The distance W_1 between the innermost side portions of the front grooves 16 and 16 in the widthwise direction of the sanitary napkin 10 is 20 mm to 50 mm. The distance W_1 is shorter than the distance W_2 between the outermost side portions of the rear groove 15 in the widthwise direction of the sanitary napkin 10.

This pair of front grooves 16, 16 are formed by applying the same groove processing as that in the case of the rear groove 15.

The front grooves 16, 16 are connected respectively to front ends of two side portions 15c, 15c of the rear groove 15. As a result, the front grooves 16, 16 and the rear groove 15 as a whole are formed into a single continuous groove.

The preferable depth D of front grooves 16, 16, the preferable ratio of the thickness at a portion of the sanitary napkin where the front grooves 16, 16, are formed with respect to the thickness of a portion where no groove is formed, and the preferable groove processing means are the same as those in the case of the rear groove 15.

The absorbent member A can be constituted by using pulp, paper, nonwoven fabric, and superabsorbent polymer which were conventionally used for forming an absorbent member of an absorbent article. From a viewpoint of forming and retaining the rear groove 15 and the front grooves 16, 16 in a more reliable manner, materials containing thermoplastic fibers are preferable.

It is preferred that the thermoplastic fibers are inter-linked within the absorbent sheet 13, because the thermoplastic fibers can retain the configuration of the absorbent sheet 13 when body fluid is absorbed, a preferable form of the sanitary napkin 10 can be

maintained in use, and the absorbent sheet 13 is returned to its original state when pressure is released, thereby retaining the sanitary napkin 1 in a stable manner with no twist.

The thermoplastic fibers are not particularly limited inasmuch as the fibers are bonded to each other by heating. Specifically, polyethylene fiber, polypropylene fiber, polyester fiber, polyethylene/ polyester conjugate fiber, polypropylene/polyester conjugate fiber, and the like are preferably used as the thermoplastic fibers. Also, polyvinyl alcohol fiber, and the like, whose fibers are readily bonded together by dissolving in hot water and drying, can preferably be used.

The absorbent sheet 13 may be formed either only from the thermoplastic fiber, or from a mixture of the thermoplastic fibers with hydrophilic fibers such as fluff pulp and rayon, and with known superabsorbent polymer. In case the mixture is used, the mixing amount of the thermoplastic fibers is preferably 1 to 30 % by weight with respect to the whole absorbent sheet 13.

The sanitary napkin 10 according to this embodiment is worn and used by placing the contacting portion 10a at the area between the legs (at the crotch

area) in the same manner as the conventional sanitary napkin.

When the sanitary napkin 10 is worn, a force in the widthwise direction is applied to the contacting portion 10a of the sanitary napkin 10 from sideways, so that the contacting portion 10a starts to curve at the front grooves 16, 16 and the area between the front grooves 16 and 16 exhibits an arch-like configuration in section with protruding towards the skin contacting surface P side. Therefore, the contacting portion 10a is able to contact the crotch area of the wearer with nicely fitting.

The body fluid of the wearer is discharged to a central portion of the contacting portion 10a.

The discharged body fluid migrates on the skin contacting surface P from a central portion of the contacting portion 10a and is absorbed into the absorbent sheet 13 and dispersed outwardly.

Then, the body fluid which has migrated on the skin contacting surface P and reached the front grooves 16, 16 temporarily stays in the front grooves 16, 16, and is absorbed and retained by the absorbent sheet 13 via the top sheet 12. The body fluid, which has not been absorbed by the absorbent sheet 13, is restrained from dispersing in the widthwise direction by the front

grooves 16, 16. Instead, such body fluid migrates and disperses in the longitudinal direction of the sanitary napkin 10. Especially, when the wearer takes the postures of lying on its back or the like, such body fluid migrates rearward.

The body fluid, which has migrated on the skin contacting surface P from the central portion of the contacting portion 10a, and arrived at the rear groove 15, temporarily stays in the rear groove 15 directly or along the front grooves 16, 16. Thereafter, such body fluid from the rear groove 15 is absorbed and retained by the absorbent sheet 13 via the top sheet 12. In case the body fluid which has arrived at the rear groove 15 is large in quantity, or in case the wearer's motion is too active, or in case body fluid migrates on the top sheet rapidly, part of the body fluid overflows the rear groove 15 and is absorbed and retained by the absorbent sheet 13 via the top sheet 12 at a more rearward area of the sanitary napkin 10.

When the body fluid migrating through the interior of the absorbent member A arrives at the front grooves 16, 16 and the rear groove 15, it is prohibited from migrating outwardly of the front grooves 16, 16 and the rear groove 15 by these grooves, and is absorbed and retained by the absorbent sheet 13 at the

peripheral areas of the front grooves 16, 16 and the rear groove 15.

In this way, according to the sanitary napkin 10 of this embodiment, since the pair of front grooves 16, 16 are formed in the skin contacting surface P of the contacting portion 10a in the longitudinal direction of the sanitary napkin 10, migration of body fluid in the widthwise direction is prohibited on the skin contacting surface P and in the absorbent member A by the front grooves 16, 16, thus preventing the body fluid from leaking through the side portions of the sanitary napkin 10. Further, when the wearer lies on its back, the migration of body fluid to the rear portion 10b is preferably promoted. Therefore, even when the wearer lies on its back, the side leakage of body fluid is satisfactorily prevented.

According to the sanitary napkin 10 of this embodiment, since the pair of front grooves 16, 16 are formed in the skin contacting surface P of the contacting portion 10a along the longitudinal direction of the sanitary napkin 10, the contacting portion 10a exhibits an arch-like configuration in wear and nicely fits to the wearer. Thus, the discharged body fluid is reliably absorbed through the contacting portion 10a, and the quantity of body fluid which reaches the front

grooves 16, 16 and the rear groove 15 is reduced.

According to the sanitary napkin 10 of this embodiment, since the distance W_1 between the innermost side portions of the pair of front grooves 16, 16 in the widthwise direction of the sanitary napkin 10 is shorter than the distance W_2 between the outermost side portions of the rear groove 15 in the widthwise direction of the sanitary napkin 10, the body fluid prohibited from migrating in the widthwise direction by the front grooves 16, 16, is reliably guided to the rear groove 15. Thus, the rear leakage of body fluid is reliably prevented by the rear groove 15.

According to the sanitary napkin 10 of this embodiment, the pair of front grooves 16, 16 are in arcuately convex configuration protruding longitudinally inwardly of the sanitary napkin 10 in plan view in laterally symmetrical relation to each other, as well as the distance W_1 between the innermost side portions of the front grooves 16, 16 in the widthwise direction of the sanitary napkin 10 is 20 mm to 50 mm, so that the contacting portion 10a is particularly nicely fitted to the wearer in wear. Therefore, the discharged body fluid is more reliably absorbed through the contacting portion 10a, and the quantity of body fluid arriving at the front grooves 16, 16 and the rear

groove 15 is more reduced.

Furthermore, according to the sanitary napkin 10 of this embodiment, the distance W_1 between the innermost side portions of the front grooves 16, 16 in the widthwise direction of the sanitary napkin 10 is 20 mm to 50 mm, as well as the absorbent member A is arranged outwardly in the widthwise direction of the front grooves 16, 16, so that the body fluid which has overflowed the front grooves 16, 16 is absorbed by the absorbent member A before the body fluid arrives at the opposing side edge portions of the sanitary napkin 10 along the longitudinal direction thereof. Therefore, side leakage of the body fluid is prevented.

According to the sanitary napkin 10 of this embodiment, since a rear portion 15b of a rear groove 15 is formed on the napkin rear portion 10b in the widthwise direction of the sanitary napkin 10, the body fluid on the skin contacting surface P and in the absorbent member A is prohibited from migrating in the longitudinal direction by the rear portion 15b of the rear groove 15. Therefore, the body fluid is prevented from leaking through the rear side.

According to the sanitary napkin 10 of this embodiment, since the distance L between the rearmost portion 15a of the rear groove 15 and the rear end of

the absorbent member A is 10 mm to 50 mm, the body fluid which has overflowed the rear groove 15 is absorbed by the absorbent member A before it arrives at the rear end of the sanitary napkin 10. Therefore, the body fluid is prevented from leaking through the rear side.

According to the sanitary napkin 10 of this embodiment, the side leakage of body fluid is also prevented in the rear portion 10b by the side portions 15c, 15c of the rear groove 15.

According to the sanitary napkin 10 of this embodiment, since the rear groove 15 includes the side portions 15c, 15c disposed along the longitudinal opposing side edge portions of the sanitary napkin 10, the rear portion 10b is also nicely fitted to the wearer in wear. Therefore, the discharged body fluid is prevented from migrating along the skin of the wearer, and the quantity of body fluid that reaches the rear portion 15b of the rear groove 15 is reduced.

According to the sanitary napkin 10 of this embodiment, since the rear groove 15 is connected to the front grooves 16, 16, body fluid is reliably prevented from leaking through any part of the sanitary napkin 10.

According to the sanitary napkin 10 of this

embodiment, since the rear groove 15 and the front grooves 16, 16 are provided with a plurality of non-continuously formed small grooves 15d, a favorable resilience is obtained in the longitudinal direction and in the widthwise direction of the rear portion. Therefore, a more satisfactory fitness is obtained, thereby enabling to prevent the body fluid from leaking through the rear and the side portions.

According to the sanitary napkin 10 of this embodiment, since the rear groove 15 and the front grooves 16, 16 are all formed by applying the same groove processing treatment from the skin contacting surface P side, all the grooves can be formed by a single process.

The second embodiment of an absorbent article of the present invention will now be described specifically with reference to the drawings. In this embodiment, members identical to those in the first embodiment shown in Figs. 1 through 3 are denoted by identical reference numerals, and description thereof is omitted.

Fig. 4 is a perspective view showing a sanitary napkin as the second embodiment of an absorbent member of the present invention.

In a sanitary napkin 20 of this embodiment, as

shown in Fig. 4, a pair of rear grooves 25, 25 are formed on the left and right area of the sanitary napkin 20 excluding the widthwise central portion. Those rear grooves 25, 25 are each connected to each of the front grooves 16, 16. A distance W_3 between the rearmost portions 25a, 25a of the rear grooves 25, 25 is preferably within 3 cm, and more preferably within 1 cm, in order to satisfactorily prevent the body fluid from leaking rearwardly.

The construction is the same as in the first embodiment except that the pair of rear grooves 25,25 are provided and there is no provision of the rear groove at the widthwise central portion.

The same function and effect as in the first embodiment can also be obtained in this embodiment.

Especially, according to this embodiment, since the pair of rear grooves 25, 25 are formed with the rearmost portions 25a, 25a being spaced apart by the above-mentioned distance, the area between the rearmost portions 25a, 25a are swollen to fit the contour of the hip portion. Therefore, excellent leakage prevention and comfortable contact to the skin can be obtained.

The third embodiment of an absorbent article according to the present invention will now be described specifically with reference to the drawings.

In this embodiment, members identical to those in the first embodiment shown in Figs. 1 and 2 are denoted by identical reference numerals and description thereof is omitted.

Fig. 5 is a perspective view showing a sanitary napkin as the third embodiment of an absorbent article according to the present invention.

In a sanitary napkin 30 according to this embodiment, as shown in Fig. 5, there is a provision of elastic members 37, 37 on opposing side edge portions along the longitudinal direction of the sanitary napkin 30 such that the sanitary napkin 30 contracts over a prescribed length in the longitudinal direction of the sanitary napkin 30, and the skin contacting surface P side of the sanitary napkin 30 is concavely curved.

This embodiment will be described specifically. The elastic members 37, 37 are, in their expanded status, fixedly secured to between the absorbent member A and the top sheet 12. The elastic members 37, 37 contract such that the skin contacting surface P side of the sanitary napkin 30 concavely curves.

As the elastic members 37, 37, a film, a fiber, a foamed body and the like composed of polyurethanes, rubbers such polybutadiene and isoprene, a polymer of ethylene-vinyl acetate and polyolefins having extensi-

bility can be used. In order to make the sanitary napkin 30 nicely fit to the wearer without degrading the wearing comfort, the elastic members 37, 37 preferably have 10 gf to 300 gf of stress at 30 % elongation. The elongation rate is the proportion of the increased length by expansion with respect to a natural length. For example, in case an elastic member having a natural length of 100 cm is expanded to 200 cm, the elongation rate is 100 %.

The construction of this embodiment is the same as in the first embodiment excepting a provision of the elastic members 37, 37.

The same function and effect as in the first embodiment can also be obtained in this embodiment.

Especially, according to the sanitary napkin 30 of this embodiment, since the sanitary napkin 30 fits to the wearer also in its longitudinal direction, body fluid is prevented from flowing along the skin of the wearer. Therefore, the functions of the front grooves 16, 16 and the rear groove 15 can be more satisfactorily exhibited, and body fluid can be more surely prevented from leaking through the side portions and the rear side.

The fourth embodiment of an absorbent article according to the present invention will now be de-

scribed specifically with reference to the drawings. In this embodiment, members identical to those in the first embodiment shown in Figs. 1 through 3 are denoted by identical reference numerals, and description thereof is omitted.

Fig. 6 is a perspective view showing a sanitary napkin as the fourth embodiment of an absorbent article according to the present invention.

In a sanitary napkin 40 of this embodiment, as shown in Fig. 6, antileakage walls 48a, 48a are formed on opposing side edge portions along the longitudinal direction of the sanitary napkin 40.

This embodiment will be described specifically. In this embodiment, a pair of flaps 48, 48 are formed on opposing side portions of the front grooves 16, 16, respectively, of the sanitary napkin 40. Each of the flap 48 is formed on a side edge portion along the longitudinal direction of the sanitary napkin 40. The flap 48 includes an antileakage wall 48a facing the top sheet 12. The flap 48 further includes an antileakage surface 48b arranged in parallel with the skin contacting surface P on the top sheet 12 side. A side pocket S is defined by the top sheet 12 and the antileakage surface 48b. The antileakage surface 48b is provided with an elastic member 49 for supporting the antileak-

age surface 48b, so that the antileakage surface 48b is reliably retained in parallel with the skin contacting surface P. According to this embodiment, due to the above-explained flaps 48, 48, advantageous effect of prevention of side leakage by the front grooves 16, 16 is further enhanced.

For more detailed examples of the flap 48, reference can be made to an absorbent article discussed in Japanese Patent Laid-Open Application No. 8-182702, an absorbent article in Japanese Patent Laid-Open Application No. 8-224271, and an absorbent article in Japanese Patent Laid-Open Application No. 8-224271.

This embodiment is the same as the first embodiment except that this embodiment includes the flap 48 having the antileakage walls 48a, 48a and the antileakage surface 48b, and the antileakage surface 48b is provided with the elastic member 49.

The same function and effect as in the first embodiment can also be obtained in this embodiment.

Especially, according to this embodiment, body fluid is more reliably prevented from leaking from the side portions owing to a provision of the antileakage wall 48a formed by the flap 48. Further, since the side pocket S is formed by folding back from the antileakage wall 48a, body fluid can also be prevented from

leaking through the side portions owing to a provision of this side pocket S. Since the antileakage surface 48b keeps a condition spread along the skin of the wearer, the configuration of the side pocket S is retained in a stable manner, and the absorbent member A is hardly twisted.

The fifth embodiment of an absorbent member according to the present invention will now be described specifically with reference to the drawings. In this embodiment, members identical to those in the first embodiment shown in Figs. 1 through 3 are denoted by identical reference numerals, and description thereof is omitted.

Fig. 7 is a plan view showing an incontinent pad for men as the fifth embodiment of an absorbent article according to the present invention.

As shown in Fig. 7, an incontinent pad 50 for men according to this embodiment is designed such that a top sheet 52 forming the skin contacting surface P, a back sheet forming a skin non-contacting surface, and an absorbent member A' interposed between the skin contacting surface P and the skin non-contacting surface each exhibit a sandglass-like configuration in section in which the longitudinally central portion C is narrow. The area located on the forward side from

the central portion C is defined as a contacting portion 50a which contacts the discharging portion of the wearer.

The incontinent pad 50 for men according to this embodiment is worn with the central portion C contacting the crotch of the wearer and with the front grooves 16 being arranged forwardly of the wearer. When the incontinent pad 50 is worn, a force in the widthwise direction is applied to the contacting portion 50a of the incontinent pad 50 from sideways, so that the contacting portion 50a starts to curve at the front grooves 16, 16 and the area between the front grooves 16 and 16 exhibits an arch-like configuration in section with protruding towards the skin contacting surface P side, thereby providing nicely fitting to the wearer.

Body fluid is prevented from leaking through the rear side and the side portions as is in the first embodiment. In this way, even in an absorbent article in which the contacting portion which contacts the discharging portion of the wearer in wear is not arranged at the crotch portion unlike the first through fourth embodiments, there can be obtained a satisfactory fitness owing to a provision of the front grooves and the rear groove. Therefore, the body fluid can be

prevented from leaking through the rear and side portions.

It should be noted that the absorbent article according to the present invention is by no means limited to the above-mentioned embodiments but that various changes can be made without departing from the scope of the present invention.

For example, the rear groove in the absorbent article according to the present invention is not limited to a single continuous groove extending from the front end to the rear end as in each of the above-mentioned embodiments. Instead, as shown in Fig. 8, the rear groove 65 may be formed in several places in a non-continuous manner.

Also, as shown in Fig. 9, the rear groove 75 may have a generally horizontal V-shaped configuration, with the apex located at the widthwise center.

As shown in Fig. 10, the front grooves 16, 16 and the rear groove 85 may be non-connected. Also, as shown in fig. 11, a front groove 99 may be additionally provided in order to connect the both front edges of the pair of front grooves.

The absorbent member may be formed from only the absorbent sheet as in the above-mentioned embodiments. In the alternative, the absorbent member may

also be formed by the combination of other absorbent sheets, superabsorbent polymers, and other absorbent members. It may also be formed from a thicker absorbent body. The thickness of the absorbent member A is preferably 1.5 mm to 15 mm.

CLAIMS:

1. An absorbent article comprising a liquid-permeable skin-contacting surface, a liquid-impermeable skin non-contacting surface, and an absorbent member interposed between said skin contacting surface and said skin non-contacting surface, and formed into a substantially elongate configuration, wherein

said absorbent article further comprises;

a pair of front grooves formed, in a longitudinal direction of said absorbent article, in said skin contacting surface of a contacting portion which is applied to a body fluid discharging portion of a wearer, in wear, and

a rear groove formed, in the widthwise direction of said absorbent article, in said skin contacting surface of a rear portion which is applied to a rear side of the wearer, in wear,

a distance between the rearmost portion of said rear groove and the rear end of said absorbent member is 10 mm to 50 mm, and

a distance between innermost side portions of said pair of front grooves in a widthwise direction of said absorbent article is shorter than a distance between

outermost side portions of said rear groove in the widthwise direction of said absorbent article.

2. The absorbent article according to claim 1, wherein a distance between the innermost side portions of said pair of front grooves in the widthwise direction of said absorbent article is 20 mm to 50 mm.

3. The absorbent article according to claim 1, wherein said pair of front grooves are each formed in a convexly arcuate configuration from the opposing longitudinal side edge portions inwardly of said absorbent article.

4. The absorbent article according to claim 1, wherein said front grooves and said rear groove are 1 mm to 10 mm in depth, and a ratio of the thickness of a portion where said front grooves and said rear groove are formed with respect to the thickness of a portion where no grooves are formed is 0.05 to 0.7.

5. The absorbent article according to claim 1, wherein opposing side edge portions along the longitudinal direction of said absorbent article include elastic members for contracting said absorbent article

over a prescribed length in the longitudinal direction thereby to provide said absorbent article with a configuration that said skin-contacting surface side is concavely curved.

6. The absorbent article according to claim 1, wherein a pair of flaps are formed on the opposing side portions of said front grooves of said absorbent article.

7. The absorbent article according to claim 1, wherein antileakage walls are formed on opposing side edge portions along the longitudinal direction of said absorbent article.

8. An absorbent article substantially as hereinbefore described with reference to, and illustrated by, accompanying Figs. 1-3, 4, 5, 6, 7, 8, 9, or 10.

The Patent Office

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Application No:	GB 9724763.9	**Examiner:**	Anwar Gilani
Claims searched:	1-8	**Date of search:**	18 March 1998

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Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): A5R (RPC, RPG)

Int Cl (Ed.6): A61F 13/15

Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	EP0621082 A1	(McNEIL-PPC) column 4 l.39-57, figures parts 13,14	1
X	EP0597273 A1	(McNEIL-PPC) parts 13,14 in figures 1 and 8, column 3 l.25-47, column 4 l.14-25	1
X,P	WO97/17922 A1	(MOLNLYCKE AB) p.12 l.15-30, figure 11	1

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.